# CONSOLIDATED ENVIRONMENTAL RESOURCE DATABASE INFORMATION PROCESS (CERDIP)

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The Consolidated Environmental Resource Data Information Process (CERDIP) is a method for the United States (U.S.) Department of Defense (DoD) to raise awareness of the existence and importance of cultural, historic and natural (CHN) resource sites located worldwide. This awareness will improve the ability of warfighters to enhance the stability and security of threatened societies, to plan operational missions, to comply with the laws of war and international agreements during the conduct of those missions, to conduct engagement events with the militaries of other sovereign States, and to interact with Other Governmental Agencies, Inter-Governmental Organizations, and Non-Governmental Organizations. Geospatial data aggregated by the CERDIP will work seamlessly with standard DoD geospatial information system (GIS) platforms. The data can be configured for use by user-friendly commercially-available off the shelf (COTS) software tools to communicate the data via the internet. This document outlines the steps in executing the CERDIP to ensure the process can be executed consistently by various users and that the resulting data layers continue to build upon each effort for a continually growing coverage of the globe.

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## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AOI | Area of Interest |
| AOR | Area of Responsibility |
| CERDIP | Consolidated Environmental Resources Database Information Process |
| CHN | Cultural, Historical and Natural |
| COCOM | Combatant Command |
| COP | Common Operating Picture |
| COTS | Commercially-available Off the Shelf |
| DFDD | Defense Geospatial Intelligence Working Group Feature Data Dictionary |
| DoD | Department of Defense |
| GIS | Geographic Information System |
| IGO | Inter-Governmental Organizations |
| IUCN | International Union for the Conservation of Nature |
| KML | Keyhole Markup Language |
| NDCEE | National Defense Center for Energy and Environment |
| NFDD | National Geospatial–Intelligence Agency Feature Data Dictionary |
| NGO | Non-Governmental Organizations |
| NSG | National System for Geospatial–Intelligence |
| OGA | Other Governmental Agency |
| QA | Quality Assurance |
| QC | Quality Control |
| SME | Subject Matter Expert |
| UNEP | United Nations Environmental Program |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| URL | Uniform Resource Locator |
| U.S. | United States |
| VEO | Violent Extremist Organizations |
| WDPA | World Database of Protected Areas |
| WFS | Web Feature Services |
| XML | eXtensible Markup Language |

## 1.0 INTRODUCTION

The Consolidated Environmental Resource Data Information Process (CERDIP) is a method for the United States (U.S.) Department of Defense (DoD) to raise awareness of the existence and importance of cultural, historic and natural (CHN) resource sites located worldwide. This awareness will improve the ability of warfighters to enhance the stability and security of threatened societies, to plan operational missions, to comply with the laws of war and international agreements during the conduct of those missions, to conduct engagement events with the militaries of other sovereign States, and to interact with Other Governmental Agencies (OGAs), Inter-Governmental Organizations (IGOs), and Non-Governmental Organizations (NGOs).

Geospatial data aggregated by the CERDIP will work seamlessly with standard DoD geospatial information system (GIS) platforms. The data can be configured for use by user-friendly commercially-available off the shelf (COTS) software tools to communicate the data via the internet. This document outlines the steps in executing the CERDIP to ensure the process can be executed consistently by various users and that the resulting data layers continue to build upon each effort for a continually growing coverage of the globe.

## 2.0 BACKGROUND

In recent history, from Bamiyan in Afghanistan to Timbuktu in Mali, the world has stood witness as violent extremist organizations (VEO) damaged, destroyed, or looted cultural artifacts as a tactic in their attempt to erase the cultural heritage of societies they desire to dominate. Similar to conflict minerals, VEOs and international criminal organizations have engaged in wildlife crimes and traded in stolen cultural artifacts to fund their destabilizing activities. Taking steps to ensure the continued existence of the physical symbols of cultural identity and important natural resources sends the correct strategic message, supports the maintenance of long-term security and stability, and contributes to the achievement of U.S. strategic goals.

Pursuant to international agreements and applicable U.S. Law[1], U.S. warfighters have a legal obligation to avoid unnecessary damage to properties of CHN significance to the extent that it is practical and consistent with mission necessity. Currently, there is no systematic process for identifying and communicating the existence of these properties and resource sites to military planners and operators. Challenges with regard to the protection of these resources are addressed as situations occur, on a case-by-case basis, normally in a just-in-time manner. The purpose of the CERDIP is to provide capabilities which will increase the visibility and sensitivity of these sites to the warfighter and thereby

[1] Public Law 89-665, "National Historic Preservation Act of 1966", as amended by PL 96-515, "National Historic Preservation Act Amendments of 1980", Section 402 "Federal Undertakings Outside the United States; Mitigation of Adverse Effects" (16 U.S.C. 470a-2) "Prior to the approval of any Federal undertaking outside the US which may directly and adversely affect a property which is on the World Heritage List or on the applicable country's equivalent of the National Register, the head of a Federal agency having direct or indirect jurisdiction over such undertaking shall take into account the effect of the undertaking on such property for purposes of avoiding or mitigating any adverse effects."

decrease risks to these resources.

The CERDIP establishes protocols for the collection and assessment of CHN location data and guidance for the operation and maintenance of this data. The process is intended to be global in scope, unclassified, and formatted to ensure it is in compliance with applicable DoD standards so that the data can be seamlessly inserted into DoD mapping platforms. Using data generated by the CERDIP, products can be generated to provide warfighters the tools needed to ensure compliance with legal requirements and operational demands.

This document first presents the definitions of CHN resource sites covered by the CERDIP. It then presents each step in the process to include defining the area of interest, identifying applicable databases, requesting and obtaining data, and aligning the data against the CERDIP Data Model. It concludes by describing the protocols for accessing and visualizing CERDIP data.

## 3.0 CULTURAL, HISTORIC AND NATURAL RESOURCES

The CERDIP has been developed to incorporate a variety of CHN resources focusing on spatial scope of the source and the resource type (cultural or natural). Site Significance categories are **Internationally Significant**, **Nationally Significant, Locally Significant** or **Unverified.** Each resource can be typed as **Cultural, Natural, Mixed or Unknown**. This framework assigns class codes for mapping and analysis that indicate ***why*** a resource is included and ***what*** that resource is. This simple schema makes it possible to assemble and map data from multiple, divergent data sources that will provide data of varying significance and quality.

**NOTE on KEY TERMS:**

**"Property" v. "Resource"**

This information management process integrates significant cultural properties and natural resource sites into a single dataset. As a result, the terms "property" and "resource" are used interchangeably to describe ***sites of significant natural, historical or cultural value.***

## 4.0 SITE SIGNIFICANCE

The Site Significance is determined by the spatial scope and the authority of the organization providing the information, as follows:

Internationally Significant (coded as "1") - Resource sites are assigned as Internationally Significant if they have been identified by an organization serving a global scope and authorized by a treaty, convention or law as the recognition/coordination authority for that resource type. Examples include United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage and Ramsar Wetlands.

Nationally Significant (coded as "2") - Resources sites are assigned the Nationally

Significant if they have been formally identified by the owning sovereign State. The presumption is locations identified by sovereign States and provided by the State for inclusion in the database are the equivalent of resources on the United States' National Register of Historic Places. Properties formally recognized and declared by a sovereign State as meeting the criteria established by the First Protocol of the Geneva IV Convention will retain their status as National resources.

**Locally Significant** (coded as "3") - Resource sites are assigned the *Locally/Regionally Significant* if they have been identified by an organization as significant and are not on an internationally- or nationally-issued list. The organization may be authorized by a treaty, convention or law as the recognition/coordination authority. Local/regional sites are those that meet the Hague Convention definitions but are not on an authorized "list."

**Unverified** (coded as "4") - Resource sites identified through CERDIP but not verified are assigned the "Unverified" code. These sites may be identified by academic institutions, professional societies, OGAs, IGOs, NGOs, or subject matter experts (SME).

## 5.0 RESOURCE AND PROPERTY TYPES

The resource type is determined by characteristics of the resources on the list, as defined below:

**Cultural -** Cultural resources are properties recognized due to their cultural, historic or societal importance. They may include but are not limited to: (1) Monuments of architecture, art or history, buildings or groups of buildings which are of historical or artistic interest; (2) Paintings, sculptures, or other works of art; (3) Manuscripts, books, and other objects of artistic, historical, and/or archaeological or ethnological interest; (4) Scientific books or visual/audio recordings; (5) Archaeological, ethnological, or prehistoric sites and artifacts; and (6) Buildings such as museums, large libraries, and depositories of archives whose main and effective purpose is to preserve or exhibit movable cultural property.

**Natural -** Natural resources are properties recognized due to their ecological value. They may include but are not limited to: (1) Species and/or habitats of endangered, vulnerable, and/or threatened fauna and flora identified by the U.S. Government, International Union for the Conservation of Nature (IUCN), or similar internationally recognized group, (2) Protected geographical areas and the flora/fauna within those areas; protected areas include, but are not limited to trans-national/national/regional parks, wildlife/forest/marine reserves, and sanctuaries; (3) Geological/physiographical formations; and (4) Challenged environments.

**Mixed -** Site contains both recognized cultural and natural resources.

**Unknown -** Unclear or unknown what type of resources are located on the site.

## 6.0 THE PROCESS

CERDIP is a repeatable, linear process of obtaining, converting and displaying information on CHN resources of significance. Figure 1 represents the process as a flow-diagram. The output of the CERDIP is a map-able CHN GIS dataset. After completing the CERDIP, the checklists, protocols and templates may be used and reused as the process is repeated. For details on these and other by-products of the CERDIP, see the CERDIP By-Products section.

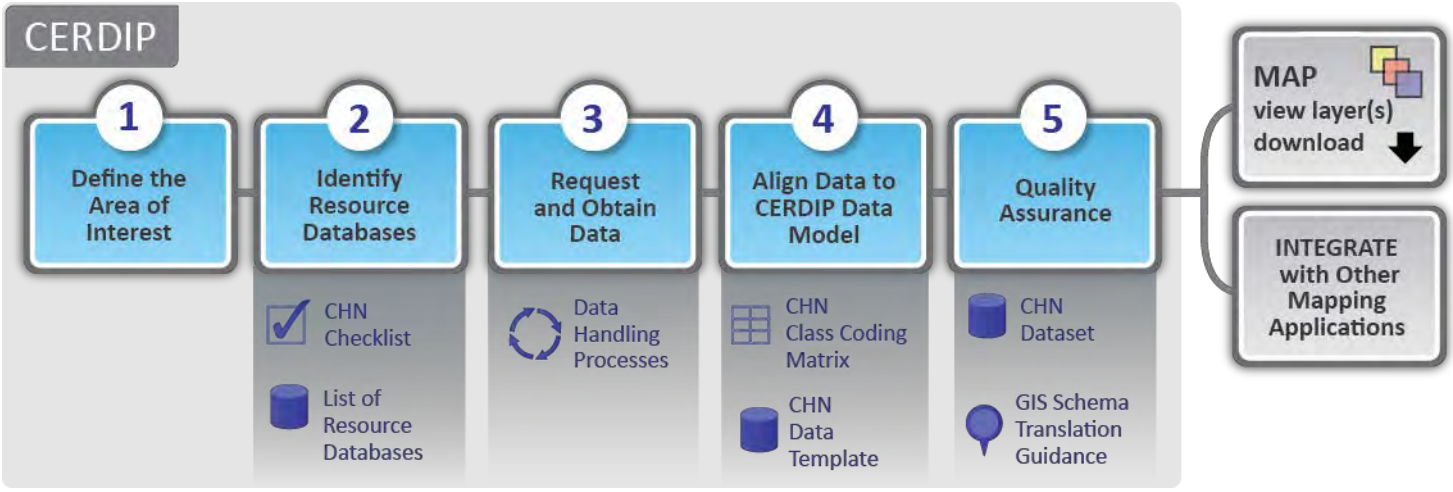


**Figure 1. Consolidated Environmental Resource Database Information Process**

### 6.1 STEP 1: Define the Area of Interest

Generally speaking, identifying the Area of Interest (AOI) is the first step in executing CERDIP. AOIs may be individual sovereign States or portions of sovereign States, sub-continental regions (e.g., two or more sovereign States), continents (e.g., Africa), or portions of two or more regional commands Area of Responsibility (e.g., U.S. Central Command, U.S. European Command). The AOI defines the scope of CHN resource data collection effort to be performed throughout the process resulting in the CHN dataset. CERDIP data is stored by country code, allowing for sorting by country.

### 6.2 STEP 2: Identify Resource Databases

After defining the parameters of an AOI, the process of identifying potential data sources with jurisdiction in the AOI would be initiated. Typically, the applicable international agreements will be considered first.

Examples of international agreements include:

- 1949 Geneva IV Convention (GENEVA IV)
- 1954 Hague Convention (HAGUE 54)
- 1970 UNESCO Cultural Property Convention
- 1971 Ramsar Convention
- 1972 UNESCO World Heritage Convention
- 1973 Treaty on Trade in Endangered Species
- 1992 Convention on Biological Diversity

As each applicable agreement is reviewed, the corresponding authoritative data source listing or organizations with the listing authority are identified. Examples of such sources include the World Heritage Sites database maintained by UNESCO and the World Database of Protected Areas (WDPA) maintained by the United Nations Environmental Program (UNEP). These resources are afforded the *Internationally Significant* code in the CERDIP.

Second would be nationally recognized items. *Nationally Significant* sites are those published or provided directly by the sovereign State. Since the complexity and organizational structure of state governments will vary, it will be important to consider that more than one division of a state government may authoritatively identify resources on behalf of the nation. In many cases, a minimum of two data sources will exist – one for cultural and the other for natural items. As stated earlier, properties identified by sovereign States as meeting the criteria established by the 1st Protocol of the Geneva IV Convention and properties identified as recognized by a regional agreement will be afforded the *Nationally Significant code* in the CERDIP. Protocols for requesting such materials will need to be established based on the political and military context of the U.S. involvement with that sovereign State.

There should also be consideration for Locally Significant sites. For instance, there is a trend towards aggregating conservation areas across international boundaries, so locally significant CHN resources may be document through these agreements. Furthermore, the HAGUE 54 Convention provides a very broad definition of significant properties that may not be on any list of recognized sites, but will be protected.

Examples of regional agreements are:

- 1981: Abidjan Convention for Cooperation in the Protection + Development of the Marine + Coastal Environment of the West + Central African Region
- 1985: Convention for the Protection of Architecture of Europe
- 2002: Great Limpopo Transfrontier Park Agreement

After considering authoritative avenues to identify CHN resources it may be valuable to identify additional specialized data sources. Depending on the mission and the AOI, this additional information may be critical. It should be noted that non-authoritative sources may be subjective and have varying motivations for recognizing CHN resources. Nevertheless, it may be of value to identify and seek information from

competent technical authorities. Information obtained from these sources will be considered *Unverified* until the significance can be ascertained. Depending on existing relationships with and among available SMEs, individual subject matter experts may be identified as resource databases. Alternatively, when appropriate, SMEs may be asked to collaborate and act as a single resource database. It is anticipated that obtaining this information may require more time and effort than information obtained from international, local, or sovereign State sources, and there will be a higher potential for the data to require more formatting.

### 6.3 STEP 3: Request and Obtain Data

Information on resource sites to be incorporated into the database may be obtained from both solicited and unsolicited data sources. Solicited sources are donors which have been identified via Step 2 and requested to supply information by an authorized representative of the entity responsible for executing the CERDIP.

Unsolicited sources are donors which have volunteered information without being individually requested to do so. Protocols for both the requesting and receipt of information should be developed reflective of the executor's needs and political context.

#### 6.3.1 Request Protocol

Since resource databases are available in a range of formats, requesting and obtaining data can take minutes to days depending on the source. Some data sources may provide publicly available downloads and not require a manual request for information. It is presumed that information/databases from these sites can be downloaded and incorporated with minimal coordination. If such listings/databases are not publically available, then requests for information on potential properties may be made to the coordinating authority. Special protocols and considerations should be made when requesting information from sovereign States.

Data request protocols should provide guidance on how information is to be obtained from potential donors. The protocol is to ensure transparency to potential information donors. The protocol should provide a generic script which will include an identification statement (a declaration the information is being requested on the part of the U.S. DoD), justification statement (why the information is being requested), a purpose statement (how the information will be used), a criteria statement (explaining the parameters governing what properties are to be incorporated into the database), and a desired format statement (detailing the desired structure for GIS data). The script should also specify how potential donors can verify the authenticity of requesters.

#### 6.3.2 Acceptance Protocol

A protocol to govern the acceptance of both solicited and unsolicited information should also be developed. The protocol should specify how the receipt of information will be acknowledged (to include guidance on situations when the donor is unknown and/or wishes to remain anonymous), how information will be stored and managed

from when it is received, what quarantine measures may be taken to ensure the security of the data, how the data will be manipulated to ensure conformance with formatting requirements, steps involved in migrating the data to the CERDIP dataset, and how information on received data (donors, sites, formats, etc.) will be maintained. Caution will be exercised when interacting with unsolicited donors, especially when donors are not affiliated and/or recognized by a competent technical authority. Technical/academic credentials of these individuals should be validated prior to the receipt of their information.

### 6.3.3 Understanding File Formats

The CERDIP establishes guidance to help the executor obtain the CHN data in appropriate formats to be readily incorporated into the workflow. The CERDIP aims to aggregate a variety of vector geometry (e.g., point, line, or polygon) geospatial data as a single layer. As the CERDIP product is intended to be a vector layer, raster data formats are discouraged because they would require significant data manipulation prior to aggregation.

As the process assembles a variety of source data, candidate datasets are not required to meet a single file-type specification. Instead, the process is capable of accepting a range of data formats. Acceptable file formats for the CERDIP range from simple delimited text files (e.g., comma separated value (.csv) files) to native GIS files (e.g., Shapefiles). The CERDIP requires data to be in a formatted structure which is ready to be translated into a geospatial database schema. Unformatted documents and/or files with data requiring extraction and formatting (e.g., MSWord documents (.docx)) are not suitable for inclusion in the CERDIP.

### 6.3.4 Tabular File Formats

Data used to plot coordinates and view as overlays on a map are not required to be in a proprietary GIS file format. Many GIS platforms can digest tabular data to render points on a map without the creation of a native GIS file. Likewise, as an interim data to geospatial layer component, the CERDIP accepts properly organized and formatted data. Examples of tabular files which can be read would include: .csv, .xls(x), .mdb, .txt. Data submitted in this format should include coordinate information in decimal degree format. While unique identifiers are suggested, identifiers will be assigned in the new layer. Table 1 illustrates the suggested minimum requirements for organized, tabular data.

**Table 1. Sample of Organized Tubular Data**

| ID | Feature Name | X | Y |
|---|---|---|---|
| 1 | Site A | 13.51501 | 12.11404 |
| 2 | Site B | 34.47011 | 19.30322 |

### 6.3.5 Spatial File Formats

Native geospatial files are file formats which are readily rendered in GIS software applications. As they comprehensively describe the geo-location and associated attribution of geospatial features, common geospatial file formats will be readily included in the CERDIP workflow. Examples of common GIS file formats include the following: Shapefiles (a collection of various files requiring at a minimum: .shp, .dbf, .shx, .prj); Personal Geodatabases (.mdb), File Geodatabases (.gdb).

Additionally, geospatial files delivered and consumed in Web-based platforms are also suitable formats for data inclusion. Keyhole Markup Language (KML) files represent an open standard for storing geospatial data in an eXtensible Markup Language (XML) format which can be incorporated in the CERDIP. Web Feature Services (WFS) can also be included in the CERDIP.

While not preferred due to additional steps in the translation, other native, vector GIS file formats can be included in the CERDIP as needed. These file types included legacy ArcInfo coverages, and ArcInfo interchange files (.e00). As with all geospatial datasets, the projection and datum of the data submitted is required. While this does not need to be specified as a projection file (.prj), metadata documentation accompanying the data should include the coordinate system information.

## 6.4 STEP 4: Align Data to CERDIP Data Model

For each resource database, it's valuable to understand the contents of the data to properly align the data against the CERDIP Data Model. The CERDIP Data Model consists of a CERDIP Data Template.

### 6.4.1 Populating the CERDIP Data Template from Source Data

The available data fields may vary from each resource database. For a record to be included in the CERDIP Data Template, the record must provide at minimum Description/Title and Location information. If a record does not have a Description/Title and Location, it will not transfer into the CHN Data Set. Table 2. Information Collected From and Attributed To Data outlines the other data fields from the source records that are aggregated in the CERDIP Data Template.

**Table 2. Information Collected From and Attributed to Data Sources**

| Description | Notes |
|---|---|
| Description/Title of the CHN Resource (REQUIRED) | The proper title must be provided by the source. This is not the unique identifier which will be assigned by CERDIP. |
| CHN Feature Description | A resource category/type can be used to further describe the resource. CERDIP will absorb this information if it is provided. If not provided, this will remain blank. This information may also assist in the translation to other DOD data models. |
| Location of the CHN Resource (Latitude, Longitude, Geometry) (REQUIRED) | The purpose of the CERDIP is to assemble the CHN resources for plotting on a map. To be able to map the resource, the location needs to be collected. At a minimum, the Latitude and Longitude of the item is required. By default, the process will render the resource as point, unless sufficient GIS geometry is provided to plot the resource as a polygon or line. |
| Country (REQUIRED) | The country in which the CHN resource is physically located. The country may be a Country Name or a numeric ID (3-character minimum) from the International Standards Organization 19000 Standard. This is required field in the CERDIP Data Template. |
| Data Source Name | As an aggregation process, it is important to capture the source of the data so it can be attributed appropriately and updated on a recurring basis. |
| Date the data was obtained (REQUIRED) | The date and time at which the data is obtained must be included in the template. It is at the discretion of the analyst executing CERDIP what ranges of data are acceptable for the timeliness and accuracy of the information. This is a required field within the CERDIP Data Template. |
| Link to view the source record, if available. | If the data source provides a Uniform Resource Locator (URL) to view the record in fuller detail |

Table 3. Analyst-Coded Data Fields outlines the information to be derived by the analyst executing the CERDIP which include assigning a Unique Identifier, Distribution Sensitivity, and Quality Check. A description of how these are assigned follows the Table. A description of how Site Significance and Resource Type are assigned is included in the Introduction on page 2. To the extent possible, the features and attributes should be compliant with the following: National System for Geospatial–Intelligence (NSG); National Geospatial–Intelligence Agency Feature Data Dictionary (NFDD); and the Defense Geospatial Intelligence Working Group Feature Data Dictionary (DFDD). The features and attributes must be NSG/NFDD/DFDD compliant in name, description, and notes in order to be truly usable by the warfighter. A list of NFDD cultural property feature names and descriptions are included at the end of this document as part of the CERDIP data schema.

**Table 3. Analyst-Coded Data Fields**

| Description | Notes |
|---|---|
| Date Obtained | **Date data acquired from data source (e.g. downloaded).** |
| Data Link | URL to search data source page for feature by name and country. |
| Unique ID | Country Code Site Number Version Number<br>3 character country code, followed by unique number, followed by version number |
| Resource Type | Attribute value (Cultural or Natural) to describe feature based on data source interest:<br>(1) Cultural<br>(2) Natural<br>(3) Mixed<br>(4) Unknown |
| Site Significance | Describes source coverage and/or inclusion of recognition levels.<br>(1) International<br>(2) National<br>(3) Local<br>(4) Unverified |
| Country Name | English spelling of country name for feature. |
| Country ID | Geopolitical Entities, Names, and Codes (GENC) Standard Edition 1 URL (3-char) (e.g. ge:ISO1:3:VI-13:KEN). |
| Data Source | Name of data source or provider. |
| Distribution Sensitivity | Permission level for data dissemination:<br>(1) Restricted<br>(2) Limited Distribution<br>(3) Unlimited Distribution |

**Table 3. Analyst-Coded Data Fields (Continued)**

| Description | Notes |
|---|---|
| Feature Type | Feature type "Cultural Site Registration" will be assigned to all records that have a clearly identified driver. All others will be blank (Null). |
| Quality Check | Qualitative/Ordinal ranking to indicate level of validity of the data; also to indicate if any QA/QC was performed<br>(1) None = no QA/QC performed<br>(2) Unverified = QA/QC performed but unable to validate coordinates/descriptions<br>(3) Poor = coordinates are inaccurate<br>(4) Good = coordinates are accurate |

### 6.4.2 Assign Unique Identifier

Each record contained in CERDIP dataset will have a unique identifier. The site number will be a running number that is generated using the country code plus a system-assigned number. It will also include the "version" number – all records start with "0" until a revision is made to any attribute; once a revision is made the numbers progress in order .1; .2; .3; etc., In this way, if a record for a particular site is improved, as in through new data source or through SME review as part of the Quality Check, then a new record is created and the original record retained.

### 6.4.3 Determine the Appropriate Distribution Sensitivity

Prior to aggregation, based upon copyright and distribution restrictions, files on resources in the CERDIP database will be characterized into one of three ratings. These ratings determine the accessibility of the records to various end users. The Distribution Sensitivity categories are described below and depicted visually in Figure 2.

Restricted (code as "1") - These files have been provided by donors with copyright restrictions which preclude distribution. Site information should not be made available to certain allies (e.g., religious structures or repositories of minority groups within their jurisdiction). The information in these files will not available for unrestricted public viewing/distribution.

Limited Distribution (coded as "2") - These files have been provided by donors with specified copyright and/or distribution restrictions. Consistent with those restrictions they will be made availability for viewing/distribution with restrictions on a case-by-case basis. Site information can be made available to all allies.

Unlimited Distribution (coded as "3") - Site information can be made available to the public.

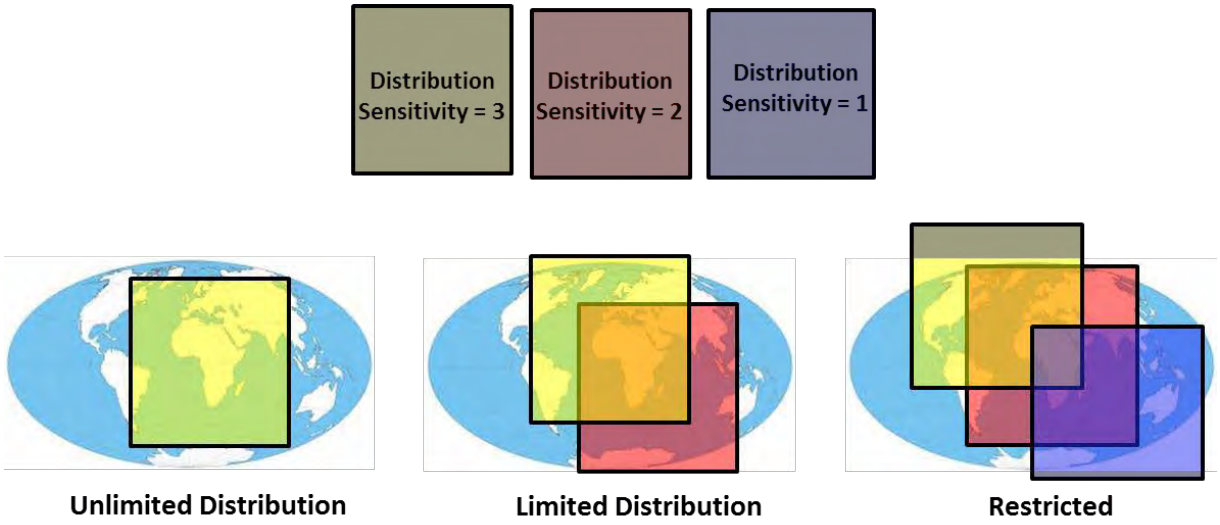


**Figure 2. Mapping CHN Data by Distribution Sensitivity**

### 6.4.4 Indicate the Data Quality

As part of the data entry, the analyst will indicate the extent to which records have been quality checked and the results of that check (if applicable). Analysts performing Quality Control and Quality Assurance (QA/QC) will be able to upgrade this attribute based on the results of the QA/QC effort. The next section describes approaches for QA/QC. The applicable categories are as follows:

None - no QA/QC performed
Unverified - QA/QC performed but unable to validate coordinates/descriptions
Poor - coordinates are inaccurate
Good - coordinates are accurate

## 6.5 STEP 5: Quality Assurance/Quality Control (QA/QC)

Depending on the mission of the individual executing the CERDIP, quality assurance can vary widely to result in a high-fidelity dataset. Being conscious of the QA/QC requirements, the QA/QC role may be filled by a government individual or to a contracted QA/QC team. It is important to understand that some data received may be provided with distribution limitations. Therefore, data assembled via CERDIP may require Non-Disclosure Agreements (NDAs) for the QA/QC role to adequately be performed. When possible, the CERDIP recommends a non-biased Quality Assurance Team be assembled to objectively review any subjective information collected.

The quality or accuracy of the geospatial data for CHN sites obtained for CERDIP will need to be evaluated to determine the acceptable use level. Use level is driven by the acceptable risk to the resource from awareness training (low risk) to military operational planning (high risk). The degree of QA/QC is driven by the intended use of the data. Figure 3 summarizes approaches to QA/QC as the end use changes. These recommended

approaches would need to be tailored to the specific user needs. But all future users will benefit from QA/QC performed by others as records are updated in the CERDP database.

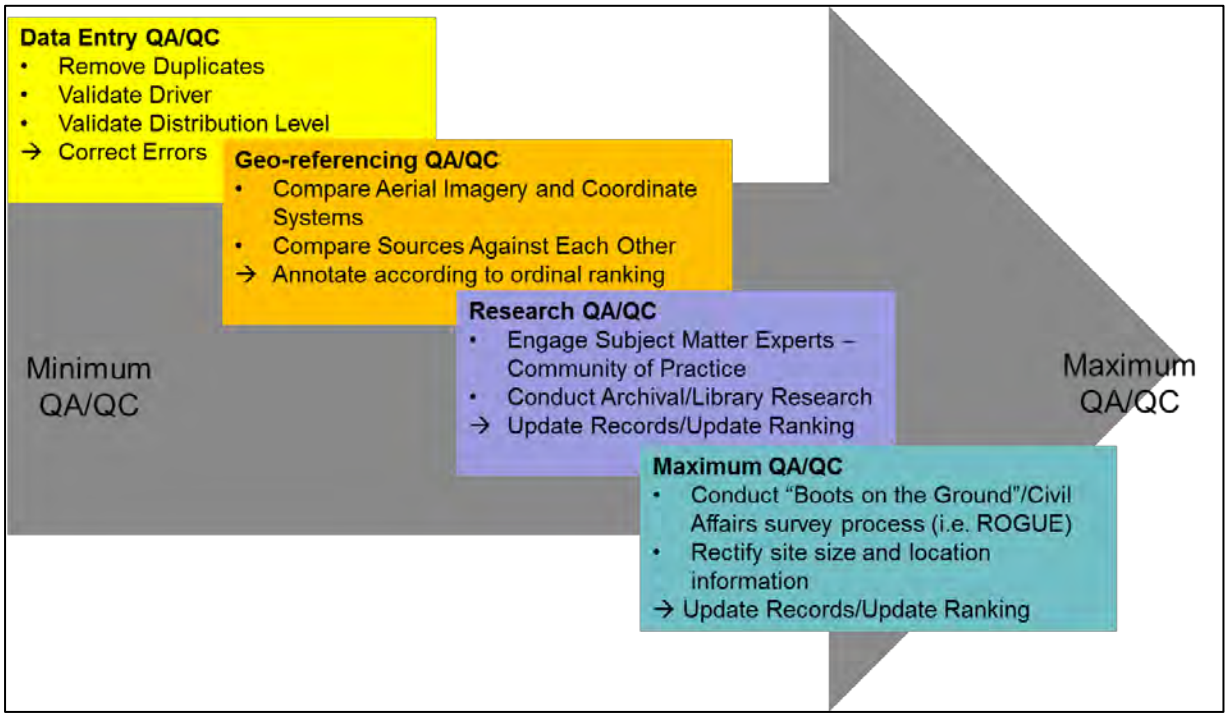


**Figure 3. QA/QC Approaches**

The following steps can be followed for QA/QC of data. Additional steps may be added for higher levels of quality assurance, as depicted in Figure 3.

**Step 1: Remove Duplicates**

Remove duplicate data when the same records are present that provide the same coordinates. If the same site has more than one record but different coordinates are provided from different sources, both records should remain until accuracy can be determined. After the ordinal ranking of accuracy is assigned, the ranking may be used as a way to remove duplicate data representing a single feature by discarding the lower ranking record.

**Step 2: Validate the Driver**

Ensure that data acquisition and initial QA/QC procedures are conducted on CHN sites in accordance with appropriate legal or policy drivers.

**Step 3: Import and overlay the geospatial data over imagery**

Identify and obtain high-quality imagery data. This data may be available from the respective CHN data sources. Non-government organizations (NGOs) that focus on similar geographic areas and issue areas may have access to other imagery files and may

be willing to share this data and/or conduct locational accuracy assessments themselves. If not provided by the source, or another NGO, it is possible to overlay the data in Google Earth, but be aware of limitations for Google Earth. The Google Earth coordinate system is a Web-based one and has a shift so that features will not overlay correctly at a small scale.

**Step 4: Evaluate Locational Accuracy of Features**

Using the geospatial data in conjunction with published descriptions, evaluate the imagery to determine the presence or absence of the feature in question. If the feature is clearly present and identifiable, evaluate the locational accuracy of the data and identify nature, magnitude, and possible sources of error.

**Step 5: Assign a QA/QC Rank**

All data that is evaluated for quality will be assigned an ordinal ranking indicating its accuracy and this ranking determines its potential use level. The applicable rankings were described above.

**Important**:
(1) If the same CHN record is recognized by two different authorities, it will be included in the database twice, allowing the site to appear under multiple filters. From a record count point of view, it is acceptable for a record to appear more than once. Information provided by two different authoritative sources must be kept separately to avoid issues with security classification. (2) CHN records with a Distribution Sensitivity of 3 ("Unlimited") or 2 ("Limited") may not be edited or supplemented with additional information. Doing so would alter the attribution to the original data source and require the Distribution Sensitivity be changed to 1 ("Restricted").

## 7.0 VISUALIZING THE CHN DATASET

When loaded into a geospatial information system (GIS), the CHN dataset can be used to generate a wide range of physical and electronic products. Files can be used to make resources visible on traditional paper maps, operational overlays, three dimensional topographic models and visual training aids. Electronic products which can use CHN data include Common Operating Picture (COP) applications and interactive internet-based applications.

Data with distribution sensitivity of 1, 2, and 3 may be incorporated by eventual end users into standard DoD GIS mapping databases used to support the generation of traditional mapping products, COP applications, and other such uses as may be identified. Distribution of those products and/or viewing of applications will be governed by applicable security considerations.

The CHN dataset can be imported and browsed in a mapping application similar in appearance to those currently found on the internet, and COTS tools such as the Esri ArcGIS suite.

The prototype map viewing application was developed under National Defense Center for Energy and Environment (NDCEE) Task Order 0817 as a platform to provide users with the ability to visualize CHN data sets on a range of electronic devices. Users, based upon their viewing right, will have the ability to select which resources are to be made visible on their device by owning sovereign State, geographic location, category, or name. Figure 4 is a "demo version" of the user interface through the Pacific Disaster Center Disaster Aware visualization platform.

As illustrated in Figure 2 (page 9), only data with a distribution sensitivity of 3 will be made available for unrestricted viewing. Individuals with restricted viewing rights will be able to view all distribution rating 1, 2, and 3 data.

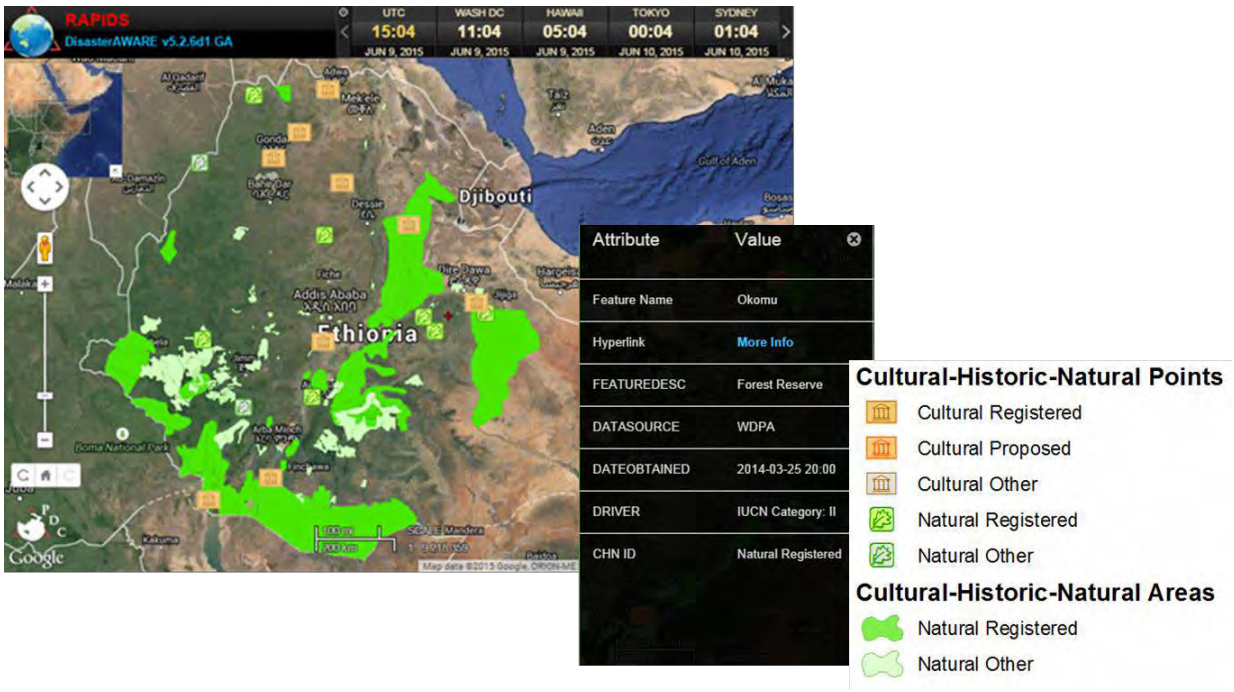


**Figure 4. Map Viewing Application Demo Version**

## 8.0 CERDIP BY-PRODUCTS

### 8.1 List of Resource Databases

A listing of Resource Databases should be created and maintained for execution of CERDIP. The intent is to provide this listing to any new executor of the process to enhance efficiency and effectiveness of the process over time. This listing is a catalog of viable data sources that contain known CHN resource information. While the List of Resource Databases can be shared between individuals executing the CERDIP, it is

recommended that Combatant Commands (COCOMs) maintain a list for their Areas of Responsibility (AOR). Table 4 presents a template for capturing resource databases.

**Table 4. Listing of Resource Databases**

| Resource Database | Office/Organization | Point of Contact | Database Type | Scope of Data | Database Model | Update Frequency |
|---|---|---|---|---|---|---|
| Name of Dataset, Database or System | Government Office, or owning organization | Individual point of contact | Type of geospatial data file (shp, xml, kml, other) | Global, continental, regional, country, provincial, city | GGDM, SDSFIE, others? | Authoritative, Quarterly, Monthly, as needed |

## 9.0 CERDIP DATA TEMPLATE

The CERDIP Data Template contains only the essential fields to ensure agility in accepting a large variety of datasets. It is presented in Table 5.

## Table 5. CERDIP Data Template

(*required fields)

| Field | Description | Notes |
|---|---|---|
| *UniqueID | Country Code Site Number Version Number<br><br>3 character country code, followed by unique number, followed by version number<br>_ _ _-_ _ _ _ _-_ | The site number will be a running number that is generated using the country code plus a number, it will also include the "version" number – all records start with "0" until a revision is made to any attribute; once a revision is made the numbers progress in order<br>.1; .2; .3; etc.<br><br>For a list of country codes used by DoD, see http://www2.dla.mil/j-6/dlmso/eLibrary/Documents/DoDAAD/GENC-Country-Code-List.xlsx |
| *Country | Country of Primary Jurisdiction | Anglicized versions |
| *Site Name | Site name | Site names are Anglicized versions |
| *Feature Type | "Cultural Site Registration" or blank | Categorical name for the all CHN resource NFDD (NSG Feature Data Dictionary) useful for data transferability to other users and data schema (See list of Feature Types below) |
| *Feature Desc | Description of the CHN Resource | Text (255 varchar) Derived from Source |
| *Resource Type | Cultural; Natural; Mixed; Unknown | Type of Resource |
| Site Type | Code for Site Type, see list below | Code (See List of Site Types below) |
| *Latitude of Center point | Approximate center of site | Decimal degrees |
| *Longitude of Center point | Approximate center of site | Decimal degrees |
| *Date data was obtained | XX/XX/XXXX | Date |
| *Source of location information | Text | E.g., Google Earth, Bing, ArcGIS, GPS, etc. UNESCO; RAMSAR; WDPA; other…? |
| Alternate Site Name 1 | Alternate site names | Alternate site names are usually the result of differences of transliteration into English |

## Table 5. CERDIP Data Template (Continued)

(*required fields)

| Field | Description | Notes |
|---|---|---|
| Alternate Site Name 2 | Alternate site names | Each alternate site name should have a separate column to avoid confusion |
| Main/parent site | Yes or no | |
| Sub site/child site | Yes or no | |
| Parent site | _ _ _-_ _ _ _ _-_ | If a Sub site, enter Unique ID of Parent Site |
| Area of Interest | 1;2 | 1= Site Boundaries cross borders of two or more countries 2=Site Boundaries cross borders of two or more provinces |
| Province | Name of local government administrative district | Anglicized spelling |
| City/town | Name of nearest city/town | Anglicized spelling |
| Direction from nearest city/town | N; NE; E; SE; S;SW;W;NW | |
| Aerial Description | Text | Description of site as viewed from above |
| Latitude of Easternmost edge of site | Decimal degrees | The four 'bounding coordinates' of the site should be its easternmost, southernmost, westernmost and northernmost point. Only needed if shape files do not exist. |
| Longitude of Easternmost edge of site | Decimal degrees | The four 'bounding coordinates' of the site should be its easternmost, southernmost, westernmost and northernmost point. Only needed if shape files do not exist. |
| Latitude of Southernmost edge of site | Decimal degrees | The four 'bounding coordinates' of the site should be its easternmost, southernmost, westernmost and northernmost point. Only needed if shape files do not exist. |
| Longitude of Southernmost edge of site | Decimal degrees | The four 'bounding coordinates' of the site should be its easternmost, southernmost, westernmost and northernmost point. Only needed if shape files do not exist. |

**Table 5. CERDIP Data Template (Continued)**
(*required fields)

| Field | Description | Notes |
|---|---|---|
| Latitude of Westernmost edge of site | Decimal degrees | The four 'bounding coordinates' of the site should be its easternmost, southernmost, westernmost and northernmost point. Only needed if shape files do not exist. |
| Longitude of Westernmost edge of site | Decimal Degrees | The four 'bounding coordinates' of the site should be its easternmost, southernmost, westernmost and northernmost point. Only needed if shape files do not exist. |
| Latitude of Northernmost edge of site | Decimal degrees | The four 'bounding coordinates' of the site should be its easternmost, southernmost, westernmost and northernmost point. Only needed if shape files do not exist. |
| Longitude of Northernmost edge of site | Decimal degrees | The four 'bounding coordinates' of the site should be its easternmost, southernmost, westernmost and northernmost point. Only needed if shape files do not exist. |
| Link to view the source record | http:// | Text (hyperlink if applicable) |

**Table 5. CERDIP Data Template (Continued)**
(*required fields)

| Field | Description | Notes |
|---|---|---|
| *Site Significance | 1; 2; 3; 4 | 1= International (e.g. on World Heritage List, Tentative WH List, Second Protocol List of Enhanced Protection Sites and Repositories, Tentative List of Enhanced Protection Sites, and other internationally recognized institutions, e.g. Metropolitan Museum, British Museum, etc.)<br><br>2=Nationally Significant (sites on a national list or otherwise generally recognized within a country)<br><br>3=Locally Significant (sites only protected via Hague convention)<br><br>4=Unverified (sites significance has not been verified, but the site is included in the database for its potential significance) |
| *Distribution Sensitivity | 1; 2; 3 | 1= Restricted - Site information should not be made available to certain allies (e.g., religious structures or repositories of minority groups within their jurisdiction)<br><br>2= Limited Distribution - Site information can be made available to all allies<br><br>3 = Unlimited Distribution – Site information can be made available to the public |

## Table 5. CERDIP Data Template (Continued)

\(*required fields)

| Field | Description | Notes |
|---|---|---|
| *Quality Check | 1; 2; 3; 4 | Qualitative/Ordinal ranking to indicate level of validity of the data; also to indicate if any QA/QC was performed<br>1 = None = no QA/QC performed<br>2 = Unverified = QA/QC performed but unable to validate coordinates/descriptions<br>3 = Poor = coordinates are inaccurate<br>4 = Good = coordinates are accurate |
| Current State of Preservation | Intact; partially damaged; destroyed | Intact; partially damaged (intact remains exist); destroyed. Update events happening to the site when information is available. |
| Photos available | Yes or no | |
| Available photos | List of available photographs | |
| Maps/plans available | Yes or no | |
| Available maps/plans | List of available maps/plans | |
| Additional Information available | Yes or no | |
| Additional information | List of information such as academic publications of work at the site | |

## Table 6. List of Feature Type as Assigned in the NFDD

| | | | |
|---|---|---|---|
| Burial Site | 23 | The location within which one or more corpses are entombed or an area of ground in which the dead are buried. | For example, a cemetery, a grave, and a crypt. |
| Cathedral | 1 | A Christian church, specifically of a denomination with an episcopal hierarchy (for example: Anglican, Catholic or Lutheran), that serves as the central church of a diocese, and thus as a bishop's seat. | As cathedrals are often particularly impressive edifices, the term is sometimes also used loosely as a designation for any large important church. |
| Chapel | 2 | A private Christian church or similar place of worship (for example: a dedicated chamber or sanctuary within a building). | When a free-standing building it may be smaller than a (public) church and is located on the grounds of an institution (for example: a college, a hospital, a palace, an estate, or a prison) where it may be attached to a larger building. |
| Church | 3 | A structure reserved for religious or spiritual activities, usually Christian. | |
| Convent | 18 | A facility housing a community of priests, religious brothers and/or religious sisters that is meant to be the presence in the world of a group dedicated to charitable or preaching service. | The religious orders served are mainly those in the Roman Catholic Church and, to a lesser degree, in the Anglican Communion. May be used to refer specifically to a community comprised only of religious sisters. Both religious brothers and religious sisters take vows, usually of poverty, chastity and obedience. |

## Table 6. List of Feature Type as Assigned in the NFDD (Continued)

| | | | |
|---|---|---|---|
| Hermitage | 21 | A secluded residence, allowing life in relative seclusion and/or isolation from society. | The resident (termed a 'hermit') renounces worldly concerns and pleasures in order to come closer to the deity or deities they worship or revere, a form of asceticism. |
| Islamic prayer hall | 25 | An open space, usually roofed as a hall that is intended for use in public Muslim worship. | It has been prepared for the purposes of performing the five obligatory prayers of Islam ('salat') and includes a niche denoting the direction of Mecca (the 'mihrab'), to the right of which is usually located a stepped pulpit (the 'minbar'). |
| Minaret | 5 | A tower providing a vantage point from which a muezzin (a servant at a mosque) can call at hours of prayer. | Usually a tall, graceful spire, with an onion-shaped crown, connected with a mosque. May be either free standing or much taller than any surrounding support structure. |
| Monastery | 19 | A facility housing a community of monks living in seclusion, adopting a strict religious and ascetic lifestyle and retreating from the world for contemplative prayer. | The community usually follows a single rule, is governed by an abbott, and all members live together, pray together, and share all possessions. |
| Mosque (alias Masjid) | 7 | An Islamic temple, reserved for religious or spiritual activities | |
| Pagoda | 8 | A Hindu or Buddhist temple or sacred building, usually in the form of a many-tiered tower with stories of diminishing size, each with an ornamented projecting roof. | It is evolved from the stupa but it can be entered and may serve a secular purpose. They are found mainly in east Asia whereas the stupa is found in India and south-east Asia |

## Table 6. List of Feature Type as Assigned in the NFDD (Continued)

| | | | |
|---|---|---|---|
| Shrine | 11 | A place of worship or devotion to a saint or deity, usually housing a relic (for example: a bone or other body part) or man-made object (for example: an icon) that is venerated for the deity, spirit or daemon that it embodies. | May be constructed on a site which is thought to be particularly holy, as opposed to being placed for the convenience of worshippers, and consequently may be associated with the practice of pilgrimage. |
| Stupa | 12 | A round, usually dome-shaped, Buddhist shrine topped with a cupola. | It is intended to house relics of the Buddha, and includes such features as the torana (gateway), the vedica (fence-like enclosure), the harmika (a square platform with railings on top of the stupa), the chattrayashti (a parasol or canopy) and a circumambulatory around the stupa. |
| Synagogue | 13 | A place for Jewish worship and religious instruction. | May also be termed a 'temple' by some Reform and conservative congregations, although Orthodox Judaism reserves that term for the Temple in Jerusalem |
| Temple | 15 | An edifice reserved for rites and rituals (for example: prayer, sacrifice, Masonic ritual). | In some religions it is regarded as the dwelling-place of a god or gods. Many religions have specialized versions of this term (for example: a Christian church, a Mormon temple, or an Islamic mosque). |

## Table 6. List of Feature Type as Assigned in the NFDD (Continued)

| | | | |
|---|---|---|---|
| Museum | 905 | A permanent institution in the service of society and of its development, open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education, enjoyment, the tangible and intangible evidence of people and their environment. | |
| Library | 902 | The documentation and information activities of libraries and archives of all kinds (for example: reading, listening and viewing rooms; organization and cataloguing of collections; lending and storage of books, maps, periodicals, films, records, tapes and/or works of art; or retrieval activities in order to comply with information requests). | The library or archive may provide service to the general public or to a special clientele (for example: students or scientists). |